

CLAIMS

1 1) A method of acquiring, storing, retrieving and displaying a
2 medical diagnostic image comprising the steps of

3 a) acquiring said image having a first resolution, and
4 translating said image to a predetermined digital format,

5 b) storing said digitized image in a computer memory at a
6 first location,

7 c) requesting said image from a user-operated terminal
8 having a predetermined resolution limit and located at a
9 second location,

10 d) creating from said digitized image, at said first
11 location, by means of a first algorithm, a patterned and
12 compressed representation thereof,

13 e) transmitting from said first location to said terminal a
14 first portion of said stored patterned representation,

15 f) reconstructing, at said terminal, by means of a second
16 algorithm, from said first portion of said patterned
17 representation, a first displayable representation of said
18 diagnostic image, said first displayable representation
19 having a second resolution no greater than said first
20 resolution,

21 g) displaying said displayable representation at said
22 terminal,

23 h) transmitting from said first location to said terminal an
24 additional portion of said patterned representation,

25 i) reconstructing, at said terminal, by means of a third
26 algorithm, from said additional portion of said patterned
27 representation, an improved displayable representation of
28 said image, said improved displayable representation having
29 a third resolution greater than said second resolution,

30 j) repeating steps g), h) and i), thereby progressively
31 increasing the resolution of said displayed representation
32 until said displayed resolution attains the lesser of

33 said first resolution of said image or

34 said predetermined resolution limit of said terminal.

1 2) A method of Claim 1 including an additional step of

2 k) enhancing, by means of a fourth algorithm, said displayed
3 representation.

1 3) A method of Claim 2 wherein said fourth algorithm comprises
2 enhancing an edge contrast of said displayed representation.

1 4) A method of Claim 2 wherein said fourth algorithm comprises
2 enhancing a gray level contrast by means of gray level region
3 expansion.

1 5) A method of Claim 2 wherein said fourth algorithm comprises
2 differential gray level tracking and gray level enhancement.

1 6) A method of Claim 1 further comprising an additional step
2 after step g) of defining a sub-image of said visual
3 representation by means of a user-operated computer-interactive
4 device operatively connected to said terminal, and wherein said
5 subsequent reconstructions in step j) are directed at
6 reconstruction only of said sub-image.

7 7) A method of Claim 1 wherein said step of acquiring said image
8 and forming a digitized representation thereof further includes a
9 step of compressing said image by means of a run length
10 compression algorithm.

1 8) A method of Claim 1 wherein said first algorithm comprises a
2 hexagonal pattern classification.

1 9) A method of Claim 1 wherein said predetermined digital format
2 formed in step a) comprises a compressed digital image, and
3 wherein said first algorithm re-expands said compressed digital
4 image before forming said patterned and compressed representation
5 therefrom.

1 10) A method of Claim 1 wherein said step of acquiring said image
2 comprises scanning a diagnostic film.

1 11) A method of Claim 1 wherein said step of acquiring said image
2 comprises digitizing a video signal.

1 12) A method of Claim 1 wherein step a) further comprises
2 acquiring, with said diagnostic image, retrieval data uniquely
3 associating said image with a patient, and step b) further

4 comprises storing said retrieval data in said computer memory.

1 13) A medical diagnostic image system comprising,

2 computer means storing a digital representation of said
3 diagnostic image having a first resolution,

4 remote terminal means having a predetermined resolution
5 limit,

6 telecommunication means linking said computer means and said
7 remote terminal means, said telecommunication means
8 comprising

9 means for creating from said digitized image, by means
10 of a first algorithm, a patterned and compressed
11 representation thereof,

12 means for transmitting from said computer to said
13 terminal a plurality of portions of said stored
14 patterned representation,

15 means for reconstructing at said terminal, by means of
16 a second algorithm, from a first portion of said
17 plurality of portions, a first displayable
18 representation of said diagnostic image, said first
19 displayable representation having a second resolution
20 no greater than said first resolution, and

21 means for reconstructing, at said terminal, by means of
22 a third algorithm, from a second portion of said
23 plurality of portions of said patterned representation,
24 and said first displayable representation of said
25 diagnostic image, a second displayable representation
26 having a third resolution greater than said second
27 resolution but no greater than the smaller of said
28 first resolution and said predetermined resolution
29 limit, and

30 means for displaying said representation at said terminal
31 means.

1 14) A system of Claim 13 further comprising means to enhance the
2 gray scale of said image and means

3 to transmit from said computer to said terminal means a
4 first data block usable to reconstruct said image without

5 said enhancement, and

6 to transmit from said computer to said terminal means an
7 said incremental block usable to reconstruct said image with
8 said enhanced gray scale.

1 15) A system of Claim 14 wherein said means to enhance the gray
2 scale of said image includes logic means to enhance an edge
3 contrast of said image.

1 16) A system of Claim 14 wherein said means to enhance the gray
2 scale of said image includes logic means to enhance gray level
3 contrast by means of gray level region expansion.

1 17) A system of Claim 14 wherein said means to enhance the gray
2 scale of said image includes logic means for differential gray
3 level tracking and gray level enhancement.

1 18) Apparatus of Claim 13 further comprising a user-operated
2 computer-interactive device operatively connected to said
3 terminal, said user-operated device defining a sub-image of said
4 visual representation, and wherein said third algorithm
5 reconstructs only said sub-image.

1 19) Apparatus of Claim 13 wherein said first algorithm comprises
2 a hexagonal pattern classification.

1 20) Apparatus of Claim 13 wherein said digital representation
2 comprises a compressed digital representation and said first
3 algorithm re-expands said compressed digital image before forming
4 said patterned and compressed representation thereof.

1 21) Apparatus of Claim 13 wherein said computer means further
2 stores retrieval data uniquely associating said image with a
3 patient.